

# RECLAMATION

*Managing Water in the West*

**DRAFT**  
**ENVIRONMENTAL ASSESSMENT**  
**MIDDLE ROSEWOOD CREEK**  
**RESTORATION**  
**IMPLEMENTATION AREA F**



U.S. Department of the Interior  
Bureau of Reclamation  
Mid-Pacific Region  
2800 Cottage way  
Sacramento, California 95825

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## **1.0 PURPOSE AND NEED**

### **1.1 Introduction**

#### *1.1.1 Project Location*

The Rosewood Creek Project Site is a branch of Third Creek, located in the Lake Tahoe Basin within Incline Village, Washoe County, Nevada (Figure 1). The Rosewood Creek watershed encompasses a total area of 1.15 square miles with the headwaters located at an elevation of approximately 8,500 feet Mean Sea Level (MSL) in the Carson Range. The middle reach of Rosewood Creek extends lake ward from State Route (SR) 431 to SR 28 and ranges in elevation from 6,371 to 6,835 feet. The proposed Project Site (Figure 2) is a portion of the middle reach between Village Boulevard and College Drive (referenced as Implementation Area F in the Implementation Plan<sup>1</sup> and this document).

The watershed is relatively long and narrow with a 2.7 mile long channel that enters Third Creek immediately upstream of Lakeshore Blvd., about 600 feet upstream from Lake Tahoe. The watershed of Third and Rosewood Creeks has been modified from its natural state through intensive logging, livestock grazing, mining, fire exclusion, and urban development. In addition to increased erosion and sedimentation, these activities have degraded the mixed riparian, wetland, and fish habitats. Urban development, in particular construction of roadways and culverts across creeks, has modified the creek beds, banks, flows, and sedimentation patterns in such a manner that has resulted in streambed incision, a disconnected floodplain, and drying of the mesic environs.

#### *1.1.2 Scope of the Environmental Document*

This document serves as an Environmental Assessment (EA) for the United States Bureau of Reclamation (Reclamation). Reclamation is the lead federal agency under the National Environmental Policy Act (NEPA). As such, this EA has been prepared in accordance with Reclamation and Council of Environmental Quality (CEQ) Regulations 40 CFR 1500 et seq.

This EA describes the existing environmental resources in the Project Site, evaluates environmental effects of the no action and preferred alternative, and proposes mitigation measures to avoid or reduce any adverse environmental effects to less-than-significant levels. The Mid Pacific Region of Reclamation must determine, based on the EA, whether or not the proposed restoration project qualifies for a finding of no significant impact (FONSI) or whether an Environmental Impact Statement (EIS) must be prepared.

Environmental compliance for the project pursuant to Tahoe Regional Planning Agency (TRPA) requirements is being completed on behalf of the Nevada Tahoe Conservation District (NTCD). A TRPA “Expanded Environmental Checklist” has been prepared in accordance with Article VIII of the Tahoe Regional Planning Compact, Chapter 5 of the TRPA Code of Ordinances, and Article IV of the TRPA Rules of Procedure, since the proposed project will occur within the Tahoe Basin.

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<sup>1</sup> Valley & Mountain Consulting, 2006

Using the findings of the Middle Rosewood Creek Geomorphic and Riparian Assessment<sup>2</sup>, the NTCD sought funding for implementation of a project that would control the source(s) of sediment originating in middle Rosewood Creek. NTCD was successful in securing funding from a Reclamation grant to be used for project planning, environmental compliance, design, and construction. The use of the Reclamation grant to fund this project constitutes the Federal Action initiating compliance with the NEPA via the Reclamation NEPA Handbook<sup>3</sup>.

The proposed Project Site (Implementation Area F) includes a parcel administered by the US Department of Agriculture Forest Service (USFS). Thus, this EA also serves to support internal USFS NEPA requirements for a parcel-level decision for issuance of a Special Use Permit to be obtained by the NTCD.

## **1.2 Purpose and Need for Action**

### *1.2.1 Purpose*

In 2005, the NTCD awarded a contract for the preparation of a comprehensive geomorphic and riparian assessment of the middle section of Rosewood Creek. Based on the results of that assessment, NTCD then retained a consulting team to prepare design for restoration of the middle reach of Rosewood Creek. The intent is to implement channel and riparian corridor measures that would limit future channel bed and bank erosion, improve channel conditions, enhance floodplain connectivity, and reduce sediment loads to Lake Tahoe. In the Project Site, no single proposed treatment can address all restoration objectives. Thus, different levels of treatment including stabilization, reconstruction, or relocation within the existing floodplain have been proposed.

### *1.2.2 Need*

Rosewood Creek has been the focus of several studies over the years aimed at identifying, prioritizing and correcting sources of pollution, particularly degraded SEZ conditions and processes that negatively affect surface and groundwater quality contributing to Lake Tahoe. Prior restoration actions on Rosewood Creek have occurred in the lower reach, primarily on public land.

The middle reach of Rosewood Creek, from SR 28 to Incline Village Mountain Golf Course in Incline Village, Nevada (Figure 2), has erosion control/sediment loading issues. In some reaches the channel has become incised while in others a wide portion of the floodplain has been eroded. As a result, relatively large amounts of sediment are being removed from the channel and are making their way to Lake Tahoe. The overall Third Creek drainage has been identified as one of the highest contributors of sediment to Lake Tahoe on the Nevada side.

The proposed project represents continued efforts to stabilize a portion of a watershed that has been subject to various historical stressors resulting in a substantial source of sediment to Lake Tahoe. The project must meet the regulatory compliance requirements of NEPA and TRPA, the planning requirements of the NTCD and Nevada Division of State Lands (NDSL), and USFS Special Use Permit requirements.

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<sup>2</sup> Mainstream Restoration, Inc., 2005.

<sup>3</sup> Bureau of Reclamation, 2000, Public Review Draft.

### 1.3 Project Background

Based on over two decades of sampling data, out of the 63 drainages in the entire basin, only the Upper Truckee River, Blackwood, Second and Trout Creeks contribute more total suspended sediment than Third Creek, measured in mean annual tons. Normalized to drainage area, however (and using only those streams with data collected for periods longer than 5 years), Third Creek produces more total suspended sediment yield than any other drainage, except for Blackwood Creek. Normalized to drainage area, Third Creek also produces large amounts of fine-grained suspended sediment. It produces about 54% of the amount of the fine-grained sediment delivered from Ward Creek and 94% of that from Blackwood Creek<sup>4</sup>.

Until recently, Rosewood Creek entered Third Creek only a few hundred yards downstream from SR 28. Rosewood Creek, between its former confluence with Third Creek and the SR 28 crossing, exhibits a relatively healthy channel with well-vegetated riparian margins. This reach of stream is stable, despite (or maybe because of) having been relocated as part of the construction of the Incline Village Middle School and associated sports complex and ball fields. Hidden beneath the dense willow along this reach, large rocks line portions of the stream banks. Upstream of SR 28, however, Rosewood Creek shows evidence of extensive vertical and lateral instability. It is this middle reach of Rosewood Creek that likely continues to contribute to the high suspended sediment load of Third Creek. This was TRPA's Environmental Improvement Program Project (EIP) #562. The Third Creek/Rosewood Creek SEZ Project (Phase I) undertaken in 1997 by the Natural Resources Conservation Service was the first step in alleviating the high sediment load supplied to Third Creek. This project involved the installation of structural controls (rock lined inlets, oil separation vault and two detention basins) in lower Rosewood Creek. The work did not fully meet the desired performance criteria. The Rosewood Creek SEZ Restoration Project, completed late in 2003, was a second sediment reduction project in the same area. The project involved extending the Rosewood Creek channel 3,000 feet further downstream, and incorporating five flow spreading basins, before it enters Third Creek at Lakeshore Blvd. Strategically placed along the stream length, these vegetated spreading basins allow fine-grain sediment to settle out before reaching Third Creek. The prior projects on Rosewood Creek did not address the sediment originating in middle Rosewood Creek, which is the focus of present efforts.

#### 1.3.1 Scoping and Public Outreach

The NTCD, as the project planning and design sponsor, has been leading all public outreach and agency advisory activities. The project has a Technical Advisory Group (TAG) comprised of the TRPA, Reclamation, USFS, Washoe County Public Works (WCPW), NDSL, and the US Army Corps of Engineers (COE). The TAG's purpose is to provide technical input and review, ensure that all relative agencies concerns and missions are represented, and to guide the project through required processes.

Specific issues that were presented to NTCD by involved agencies and/or the public and considered during the planning and design phase of this proposed project are listed below.

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<sup>4</sup> Mainstream Restoration, Inc., 2005.

- Determination of lead Agency for NEPA compliance
- Level of NEPA compliance required to support USFS Special Use Permit process
- Private property easements for construction and maintenance/monitoring
- Current and future funding requirements and sources
- Determination of project construction sponsor
- Level of alternatives analysis required by TAG as compared to the SWQIC FEA (Storm Water Quality Improvement Committee, Formulation and Evaluation of Alternatives)
- Coordination of residential BMP (Best Management Practices) retrofit requirements with proposed project design and construction
- Restoration revegetation coordination with private property landscape design

### *1.3.2 Public Outreach*

NTCD has facilitated numerous affected landowner and stakeholder meetings starting in March of 2005 that addressed the entire middle reach study area. More recently, public outreach has been focused on the Implementation Area F Project Site.

In addition, two newspaper articles were published in the North Lake Tahoe Bonanza<sup>5</sup>. NTCD has also used their website as a source for project information – [http://www.ntcd.org/documents/wrg\\_docs/RC\\_Assessment.pdf](http://www.ntcd.org/documents/wrg_docs/RC_Assessment.pdf)

A complete list of project specific outreach activities is contained in Appendix 1.

### *1.3.3 Federal Action*

Implementation Area F planning, environmental compliance, design and construction are being funded by a Reclamation grant secured by NTCD, with additional Washoe County Stream Environment Zone Mitigation Funds. Additional monies have been secured for construction and post construction monitoring from the Nevada Division of State Lands License Plate Program and the USFS – Lake Tahoe Basin Management Unit (LTBMU) Comprehensive Urban Runoff Treatment and Monitoring Program (CURTEM). The Reclamation grant to NTCD is “a major federal action” initiating the requirement for compliance with NEPA.

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<sup>5</sup> December 7, 2005; May 31, 2006



## 2.0 ALTERNATIVES

Alternatives analyzed in this document, in addition to satisfying the requirements of NEPA, must also meet to the highest extent the project Purpose and Need and result in the least environmental impact as required under the TRPA Code of Ordinances.

TRPA manages the Lake Tahoe Basin for the ultimate protection of Lake Tahoe water quality. TRPA is charged with protecting this national treasure for the benefit of current and future generations. Their vision is to have a lake and environment that is clean, healthy, and sustainable for the community and future generations. The Middle Rosewood Creek Restoration Project goals are founded in one of the TRPA's Core Values:

*Environmental Protection: Serving as stewards of Lake Tahoe and attaining environmental thresholds while sustaining the ecological, social, and economic well being of the Tahoe Region.*

While Stream Environment Zones (SEZs) such as Rosewood Creek have been found to be very effective in removing nutrients and sediments, during certain rainfall and snowmelt episodes and during unstable conditions and drying of the SEZ, SEZs can also be a source of nutrients and sediments, especially if they are disturbed. Nevertheless, the effectiveness of a functional SEZ as a sink for nutrients and sediments remains. Additional benefits of maintaining, restoring, and protecting SEZs like Rosewood Creek, are their ability to reduce flood peaks, diffuse flow, increase evapotranspiration, and increase the retention time of surface water.

### 2.1 Design Criteria

Based on numerous prior investigations, observations during site visits, and best professional judgment, SEZ restoration measures were identified for the entire middle reach of Rosewood Creek<sup>6</sup>. Each proposed restoration measure was considered to be an individual means of achieving a particular effect in a specific location, and capable of being combined with others to be applied to a larger area or stream reach as an alternative. Conceptual measures were examined in regards to their engineering, environmental, and economic feasibility, and they're potential to address identified problems. In addition, various implementation strategies were developed to identify locations that could be constructed independently, yet function together.

Preliminary restoration measures were initially developed, evaluated, compared, and screened by the TAG. Funding constraints limited the current Project Site for implementation, and thus the design criteria were revised to ensure the maximum benefit in the Project Site without adverse impacts to upstream or downstream reaches in the study area. Criteria applied at this preliminary stage of analysis (Implementation Plan), included how completely a proposed measure would address the problem, how effective the proposed measure would be over the long term, and qualitative measures of how effective a measure would be at meeting the project objectives based on costs versus benefits. Those measures that resulted in undue disturbance to stable upland and SEZ areas were screened from further consideration. Those that possessed potential for high benefit versus costs and/or potential for modification and incorporation with other measures were retained for further consideration.

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<sup>6</sup> NTCD, 2006

The portion of the conceptual level implementation plan that addresses the Project Site (Implementation Area F) is presented below. Additional details are provided in the 50% Design Plans (Appendix 2).

Implementation Area F is on the west side of Village Boulevard, extending upstream of Driver Way and to College Avenue (stations 43+25 to 49+75), and including much of reach 13 as described in the 2005 Mainstream report (Figure 2). Most of the proposed work areas and construction access/staging sites will likely be sited on private land under single ownership (Huff), but it is possible that some work areas, drainage easements, and temporary access easements may include other private parcels and/or public parcels and public right-of-way (see Table 1).

**Table 1. Land Ownership for Implementation Area F**

Downstream Station	Upstream Station	APN	Ownership
43+25	49+75	124-083-26	Private
43+15	45+40	124-083-13	Private
45+40	46+90	124-083-14	Public, U.S.F.S.
46+90	47+40	124-083-15	Private
			Public Right-of-Way (Washoe County)

### 2.1.1 Staging and Storage

Implementation Area F would require multiple staging and storage areas. The staging and storage is to be located on previously disturbed land, land proposed to be disturbed by the residential construction project, and some areas of upland and SEZ that would require revegetation. No existing trees that exceed six-inches in diameter shall be removed. The temporary easement acquisition would be obtained concurrently with any permanent easement required.

### 2.1.2 Construction Access

Construction access to the work areas within Implementation Area F would be required at two locations off of public roadways. Two access points would be located on private property – one off of Village Boulevard and one off of College Drive. One access point would be on public land off of South Dyer Circle. The access points would not require Incline Village General Improvement District (IVGID)/Washoe County encroachment permits. A temporary construction easement would be required from the private landowner, which would be readily coordinated with the permanent agreement. The USFS Special Use Permit would address the temporary access required across public land.

In order to minimize project wide disturbance associated with storage, staging, and access, these uses will be combined at each location. Thus, each construction access route would also serve to store and stage equipment. Additionally, geotextile fabric underlying temporary route surfaces (See Detail 3 on sheet D-1, Appendix 2) would protect all currently undisturbed areas that would be used as access routes.

Upon completion of construction within Implementation Area F, the staging, storage, and access areas would be restored to their previously existing condition. This revegetation plan is depicted in Figure R-1 (Appendix 2).

### 2.1.3 Constructibility

Construction in Implementation Area F would involve work in an active channel, and some work in each access and staging areas. A detailed construction schedule would continue to be refined during the final design and permitting process to minimize disturbance areas. A key feature of this focus would be construction schedule coordination with the contractor(s) for the residential projects, including landscaping, to minimize conflicts and potentially realize benefits by minimizing the area, duration, and intensity of disturbance in any one location. In addition, coordination of project schedules may allow cobble and large log resources generated on-site by the residential project to be reused for the channel restoration.

Work in the active channel will require that streamflow be temporarily bypassed during construction. To minimize risks, in-channel work would be performed during low flow conditions (summer-fall) and be complete prior to the onset of winter. This provides a narrow two to three month construction time period. Through close coordination with regulatory agencies, the design team would determine the storm event to be conveyed through the bypass facility. Final design would provide a contingency plan in the event that flows larger than the design storm occur during construction. The restored active channel would need to be stabilized to receive streamflow immediately upon completion of construction. The construction sequencing of the restoration work would be such that only one section of creek would be dewatered at a given time. Furthermore, the construction of each of these areas would be complete, prior to the execution of another area. Proposed diversion areas are depicted on sheet S-1 (Appendix 2) and called out as “gravel berm.” The proposed methods for dewatering the creek within these work areas would be the temporary “damming” of the creek with diversion by pumping to the channel downstream of the work area. The details for the berm method are shown in detail number 2 of sheet D-1 (Appendix 2). If a storm event is predicted to occur, or occurs, during the construction of the project (i.e., during dewatering operations) the detail depicted on sheet D-1, detail number 1 would be implemented to convey the flows safely through the work area.

Restoration and revegetation of access roads, storage and staging areas would occur immediately upon completion of in-channel work, and be stabilized to protect them from run-on or overbank<sup>7</sup> flows during the initial year or two prior to successful plant establishment.

Work in Implementation Area F would be completed within one construction season, unless unforeseen and atypical weather and runoff conditions require a delay.

### 2.1.4 Revegetation Objectives

Revegetation objectives for Implementation Area F were established based on the approved concept for the area to guide the 90% design. TAG approved objectives include:

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<sup>7</sup> Overbank flows occur when streamflow exceeds the channel capacity and water spreads out from the top of bank across the low portions of the surrounding floodplain. It is generally used to describe shallow, relatively low velocity flows rather than deep or swift flooding.

- Enhance and re-establish native riparian species for channel stabilization, erosion control, and habitat enhancement in and along the main channel.
- Coordinate SEZ habitat enhancement with aesthetic and fuel management goals.
- Incorporate noxious weed abatement during implementation, with continued weed monitoring and management post implementation.

### 2.1.5 Opportunities

Each Implementation Area was evaluated to identify opportunities to minimize disturbance and maximize benefit. Implementation Area F opportunities are summarized below.

- Private landowner's topographic and tree survey data is available to assist with final determination of parcel boundaries relative to the footprint of proposed work, access, and easement locations.
- Cobble and log resources generated by residential improvements may be reused by the stream restoration project; large down wood within SEZ may provide materials for the proposed project and meet other vegetation management goals.
- Possible shared credit for landowners under BMP retrofit/SEZ restoration.
- The in-channel grade control features are few and discontinuous, decreasing the area of disturbance needed for temporary access.
- Grade control within the narrow channel would prevent further down cutting and limit the amount of knickpoint migration.
- Stone materials that are stable relative to the 100-year peak flow can be keyed into the bed and banks without extensive disturbance.
- Current small areas of the abandoned floodplain in locations where the channel is only shallowly incised have potential for rewatering with pre-treated stormwater.
- Pre-treatment of roadside runoff from College Avenue and McDonald Drive for the 20-year, 1-hour design storm can be incorporated in the project.
- Low impact construction can effectively complete a project of this scale— the number, size and duration of access areas, equipment and materials, workers/vehicles, and by-pass flow needs are proportional to the size of the proposed project.

## 2.2 No Action Alternative

In the absence of the proposed project, no direct or indirect measures would be implemented to modify the existing channel, the stormwater outfalls, or to correct the channel instability and adjustment to past disturbance and continued urban hydrology and sediment loads. Over time the channel response would be to continue to incise. Knickpoints would continue to migrate upstream and the channel would widen via bank failures. These processes would destabilize SEZ vegetation and potentially create more debris jams that are a source of adverse hydraulic forces on the stream banks. There would be continued lowering of the local groundwater table, resulting in adverse impacts to present riparian vegetation.

The No Action Alternative does not meet the project goals nor objectives and thus, the Purpose and Need for the project. Knickpoint migration, streambed lowering, unstable banks resulting in stream channel widening, loss of SEZ, lowering of the groundwater table with continued incision would result in a mesic rather than an aquic moisture regime, and the lack of treatment of sediment from urban stormwater runoff would persist.

## 2.3 Alternative 1 – Preferred

### 2.3.1 Project Alternative Features/Benefits

The preferred alternative for the Project Site would implement site-specific grade control structures to stop, or minimize, the down cutting of the streambed and migration of existing channel knickpoints. The proposed improvements are shown on Sheet C-1 of the project plans, with a profile of the channel on sheet C-2 and cross sections on sheets XS-1 and XS-2 (Appendix 2). Proposed locations of the grade control structures were determined by geomorphic and engineering principles, in consideration of property ownership constraints. Furthermore, the locations were refined to directly avoid, but provide some protection to a cultural resource located on USFS lands within the project boundary. In addition, enhancements to the existing outfall at the College Avenue crossing are proposed that include pre-treatment of urban runoff along McDonald Drive and College Avenue, prior to discharge to the creek. A short section of stream downstream of the outfall of the College Avenue culvert would also be addressed to enhance the existing rock cascade streambed and lay back the overhanging stream bank which is now subject to the direct hydraulic impacts from the outfall. The enhanced rock cascade would effect a slowing of flows in this location. Proposed vegetation enhancement would stabilize banks and improve wetland vegetation communities. Details for the proposed improvements (grade control, treatment improvements, etc.) can be found on sheets D-1 through D-3 of the project plans (Appendix 2).

A significant element of the proposed project is the construction of several grade control structures to minimize streambed down cutting and migration of the existing knickpoints. Proposed grade control structures have been designed to have both static and dynamic elements. The structures are to be constructed of several different size rocks to provide stability and mimic natural streambed variability. The main structure rocks form an upstream pointed “V” weir that concentrates low flows to the center of the channel, and would have a foundation of immobile 20- to 24-inch diameter boulders (stable in the 100-year design peak flow) – the static element.

The dynamic elements include rocks to be placed downstream of the “V” weir. These are called the launch rock and are 16- to 20-inch diameter stones that can become mobile during larger events. These launch rocks are designed, sized, and quantified to “fill in” the existing downstream knickpoint as it migrates closer to each grade control structure. In addition, the rock upstream of the “V” weir is also slightly smaller than that of the “V” weir itself to reduce through flow of water in the structure and to provide material that can become mobile during larger events to fill in the launch rock deposited in the downstream scour hole.

Based on final hydraulic analysis to be completed based on the 90% design, some of the grade control structures may be raised above the existing bed (but in no case more than 18 inches), and additional mixed size bed material would be placed locally to raise the bed of the incised channel. These features would be included only to the degree that they increase the benefits of decreased bank erosion and minimal overbanking without adversely increasing the floodplain area or water surface elevation in large events (e.g., 20-, 50-, 100-year flood events).

The overall benefit of the preferred alternative would be to prevent further streambed degradation and to limit continued migration of the knickpoints. This would minimize the amount of sediment production from channel bed and banks erosion. Furthermore, the installation of roadside runoff treatment near College Avenue and McDonald Drive would

minimize the input of sediment and nutrients and other pollutants to the channel. Finally, by reconfiguring the storm drain outfall at the McDonald Drive crossing, the SEZ would be directly re-wetted to improve the natural SEZ function in this area.

Construction of the proposed improvements would be staged to minimize disturbance to the creek. Three gravel-bag temporary berms would be used to divert low-season streamflow around work areas during construction. All work associated with the improvements between the adjacent berms would be accomplished prior to starting work at any other area. In order to further minimize disturbance, the channel would be diverted during all flow events during construction, as described earlier in this document.

Revegetation elements would focus on reclaiming areas disturbed by construction, and enhancement of the existing riparian vegetation community (as shown on sheet R-1, Appendix 2). Species selection would represent those, which are native and adapted to both wet and dry conditions as are most of the species currently within the Project Site. Revegetation includes riparian community enhancement and bank stabilization treatments. NTCD has closely coordinated the proposed project design, construction, and revegetation activities with the private landowner (Mr. Robert Huff) whose properties are actively under urban development improvements including extensive landscaping.

In order to properly construct the improvements as described above, temporary access would be required to be constructed for work areas (see sheet S-1, Appendix 2). The proposed access locations were sited to maximize use of currently disturbed land. Curb approaches would be installed to protect existing curb and bike path facilities.

Storage and staging of equipment and construction materials would be conducted at access locations to minimize disturbance to the fullest extent possible. Finally, by limiting construction activities to one location at one time, a higher level of control can be exercised to ensure minimization of impacts. Upon completion of construction, all access roads would be restored to existing condition, except those that would be improved as part of the residential development.

Since most of the proposed project would be constructed on private land, easements would be obtained in addition to a USFS Special Use Permit for proposed improvements on USFS land.

Protection of existing vegetation, SEZ, and residential improvements present the most significant constraint regarding the type and size of equipment that can be used for construction. Equipment that will exert low pounds per square inch (PSI) on the native soil surface is proposed (e.g. Bobcat). In addition, project implementation proposes to maximize off street/on-site access and staging areas to minimize traffic delays.

Construction is anticipated to last one season. Construction would begin on May 1 and be complete by October 15. Traffic control would be required only when materials and equipment are to be delivered, or leave the Project Site. No roadwork is proposed, and therefore road closures or detours would not be necessary to construct the project.

### *2.3.2 Area to be disturbed*

The overall area to be disturbed includes permanent and temporary disturbance and is summarized in Table 2 below. The permanent disturbance, or change in condition, is the footprint of the grade control structures and stormwater pre-treatment improvements adjacent to the roadways. The stormwater pre-treatment features would have a permanent footprint increase

of less than 400 square feet, within uplands, and less than 40 square feet in riparian/SEZ. Within the stream channel, permanent disturbance is limited to a total of less than 300 square feet occupied by the keyed boulder “V” weirs and rock cascade, however these would be comprised of materials consistent with naturally occurring materials in the underlying geologic deposits.

The primary type of disturbance for the project is temporary, since access, storage, and staging during construction is more extensive than the permanent changes. The temporary disturbance would cover a total area of approximately 19,012 square feet (8,497 square feet within upland and 10,515 square feet within the riparian/SEZ). As stated earlier in this document, these areas would be restored with revegetation and vegetation management actions as appropriate for both habitat and fuel reduction purposes.

**Table 2. Summary of Land Disturbance**

<b>Land Type</b>	<b>Temporary Disturbance (Square Feet)</b>	<b>Permanent Disturbance (Square Feet)</b>	<b>Area to be Re-vegetated (Square Feet)</b>
<b>Riparian/SEZ</b>	<b>10,515 SF</b>	<b>340 SF</b>	<b>10,855 SF</b>
<b>Upland</b>	<b>8,497 SF</b>	<b>400 SF</b>	<b>8,897 SF</b>
<b>TOTAL</b>	<b>19,012 SF</b>	<b>740 SF</b>	<b>19,752 SF</b>

### 2.3.3 Maintenance Requirements

The Preferred Alternative was developed with in-channel features designed and spaced to withstand and perform under adverse flood conditions with no specific maintenance required.

Upon completion of the project, maintenance necessary would be minimal. The improvements to the creek would only require visual inspection on a yearly basis (spring) and after large events to make sure that large debris has not fallen into the channel thus, creating a blockage or local erosion problem. If this happens, the debris would need to be removed and disposed of. The only other maintenance necessary would be the removal of sediment from the stormwater treatment devices proposed along road shoulders to treat roadside runoff. This would be performed in a manner similar to the standard practices of Washoe County and IVGID (use of a Vactor truck to clean out sediment traps, vaults, etc.). To ensure obstructions do not reduce the capacity and performance of the proposed sediment cans, Washoe County would inspect the facilities after large storms and perform the required maintenance, as the facility would be located within Washoe County Right-of-Way.

## 2.4 Selection of Preferred Alternative

The Preferred Alternative Design was selected to minimize the proposed disturbance footprint relative to benefits gained by the project, and to provide required improvements integral to the goals of a private landowner, public agency participants and project sponsors.

## 2.5 Alternative(s) Eliminated from Analysis

The 2005 assessment by Mainstream summarized and screened conceptual restoration approaches developed by prior studies in the area (USACOE 2004, ENTRIX 2001, and Swanson 2000) and presented suggestions and priorities for restoration of all portions of the middle reach of Rosewood Creek. The current design team proposed a Concept Plan/Implementation Plan in 2006<sup>8</sup> for the entire middle reach. However, an alternative that was comprehensive and extensive, including all 7,400 linear feet of the creek was screened out due to the need for complex easements, coordination, and phasing that could not be accomplished with the available funding. Therefore, the first level screening was for high priority, effective Project Sites that could be implemented independently and within available funding. Implementation Area F was selected for the reasons mentioned above under Section 2.3.

Alternatives considered for Implementation Area F from the prior studies ranged from culvert maintenance/channel debris removal (USACE 2004) to complete filling of the incised channel (Mainstream 2005). The current design team considered continuous bank stabilization/grade control or full restoration within the Implementation Area F during 2006 Concept Plan development. These alternatives were screened out based on limited benefit (culvert/debris maintenance only), and excessive disturbance of existing vegetation and other resources (i.e., cultural resource), respectively.

## 2.6 Operation, Maintenance and Replacement Measures

The stormwater runoff treatment facilities will be located within Washoe County Right-of-Way. Thus, as a part of Washoe County's standard maintenance procedures, Washoe County would perform maintenance twice a year and /or after significant storm events.

It is possible that performance problems or hydraulic obstructions may damage or affect the channel grade control features. This may include migration of launch rock that is intended to fill in any downstream scour holes occur over time and after larger storms as the knickpoints migrate between the grade controls. The current design team recommends that the project sponsor inspect the project after large storms (>25-year event) and/or every 3 years to monitor performance and contract to perform measures as determined appropriate by the project construction sponsor.

## 2.7 Environmental Commitments

The proposed project, by design and regulation is an Environmental Improvement Project, thus, it is proposed that the restoration of the middle reach of Rosewood Creek would create long-term environmental benefits:

- a. Alleviate long-term adverse water quality impacts resulting from unstable and eroding stream channels within Area F of Rosewood Creek. The project provides vertical grade stabilization in a historically disturbed and degrading stream. The project will prevent continued streambed and stream bank erosion that generates sediment transported to lower Rosewood Creek and Lake Tahoe, and,

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<sup>8</sup> NTCD, 2006



b. Provide permanent BMPs to pre-treat urban runoff prior to discharge to the creek from McDonald Drive and College Avenue. The proposed project incorporates elements within the roadside Right-of-Way that upgrade or constructs new stormwater BMPs of appropriate size, type, and location to reduce urban pollutants in flows discharged to the creek, and to direct the stormwater to locations along the riparian community that will benefit hydrologically.

The implementation of the Preferred Alternative would include mitigation measures to:

- 1 Provide appropriate measures to protect water quality including temporary BMPs during construction. The project design includes standard BMPs (Sheet S-1, Appendix 2).
- 2 The final design would use updated hydraulic modeling from the summer 2007 field topographic survey of bed and bank elevations to refine the proposed grade control structure elevations in a manner that limits water surface increases to one foot or less and restricts the maximum 100-year floodplain area to the SEZ width.
- 3 Protect and enhance the riparian plant community. The proposed project includes design elements to limit disturbance to only that necessary to conduct the construction activities offering the maximum protection to existing vegetation and all trees over six-inch in diameter. In addition, restoration revegetation design would focus on using native species that are adapted to wetting and drying conditions of this SEZ and that enhance the plant community structural and species diversity but yet still mimics the existing communities.
- 4 Reduce existing down and dead fuels within the areas of project disturbance. To the extent possible, construction activities will remove down and dead fuels during access to work areas. In addition, private landowners will be provided with guidance for management to enable them to maintain healthy plant communities and reduce fuel hazards.
- 5 Given the unique nature of Feature RC-3, the project sponsor, with the assistance of the Cultural Resources Specialist has established a buffer zone of ten (10) feet on all sides of the feature to protect its remaining integrity. This buffer would be noted on all plans and in the specifications and flagged in the field prior to construction.

### 3.0 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES & PROPOSED MITIGATION MEASURES

This chapter discusses resources that may be affected by actions taken to implement the proposed stream restoration within the Middle Rosewood Creek Implementation Area F Project Site. During preparation of this environmental assessment, information on issues and concerns was received from the public, regulatory and resource agencies (see Chapter 4, Consultation and Coordination).

For each resource, the potentially affected area and/or interests are identified, existing conditions described, and impacts predicted under the No Action and Preferred Alternative scenarios.

#### 3.1 Geology and Soil Resources

Mainstream Restoration Inc. previously researched the Geology and Soil Resources for the middle reach of Rosewood Creek<sup>9</sup> discussed below.

The study reach of Rosewood Creek is on a broad glacial outwash sheet consisting of two large and contemporaneous alluvial fans<sup>10</sup> of this area. The opposing flanks of these gently sloping glacial outwash fans confine the channel location or its geomorphic position. The eastern fan is composed of layers and lenses of alluvial sand and gravel derived from late Pleistocene alpine glaciers in the Third Creek watershed to the northeast. The western fan is composed of similar alluvial deposits derived from Wood Creek. These watersheds are comprised of granitic bedrock capped by volcanic rocks.

Soils in the study area are comprised of the Inville Stony Coarse Sandy Loam soil. This soil type has been subdivided into three groups, Soil Units, IsC, IsD and IsE, based on the slope of the ground surface ranging from 2 to 9%, 9 to 15%, and 15 to 30%, respectively. Soil Unit IsC occurs along most of the study area of Rosewood Creek while Soil Unit IsD occurs only in the uppermost part of this reach. These soils are composed of more than 50% sand, mostly coarse sand, 20% or more granitic and volcanic rocks 10 inches or more in diameter, with lesser amounts of clay and silt. These soils are moderately well to well drained and may be consolidated.

A preliminary geotechnical investigation<sup>11</sup> was conducted for the study area that included specific bank sampling within the Project Site, in locations representative of proposed grade control structures. Both loose bulk samples from each strata layer located in the above bank areas and bank profile sites were collected and analyzed. Laboratory testing included particle size analysis and Atterberg limits. Soils were found to be composed of loose to dense poorly graded sand, silty sand, clayey sand, poorly graded sand with silt and well-graded sand with silt. Several of the strata in the bank profiles also included varying amounts of gravel, cobbles, and boulders <4 ft in diameter to a depth of 3.5 feet.

In addition, very close coordination and sharing of geotechnical information has occurred with the USDA-Agricultural Research Service, National Sedimentation Laboratory (ARS-NSL) who collected data on the stream banks and streambed throughout Rosewood Creek as part of an

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<sup>9</sup> Mainstream Restoration, Inc., 2005.

<sup>10</sup> Saucedo, 2005

<sup>11</sup> Wood Rodgers, 2006

analysis in support of the Lake Tahoe Total Maximum Daily Load (TMDL) process. These data will continue to be available and used during refinements in final design.

### 3.1.1 Impacts

No Action Alternative: Under the No-Action Alternative, the current channel instability would continue including down cutting of the streambed as the knickpoints migrate, undercutting of stream banks, and bank erosion that generate sediment to be transported downstream.

Preferred Action Alternative: Construction activities for the Preferred Action would result in short term impacts related to working in the problem areas – access routes, storage and staging, and the permanent footprint areas would be temporarily disturbed and vulnerable to erosion. Potential impacts would be minimized to the maximum extent possible with designed avoidance of existing densely vegetated areas, implementation of Best Management Practices (BMPs) in the form of temporary water quality protection and permanent soil stabilization measures.

### 3.1.2 Proposed Mitigation

During construction temporary BMPs would be installed and maintained to protect the water quality of Rosewood Creek and Lake Tahoe. The Preferred Action Alternative Design (Appendix 2) represents the permanent BMPs that would be installed.

## 3.2 Wetlands and Stream Environment Zone

A Routine On-Site Wetlands Delineation and Inventory of waters of the United States (WOUS) and Stream Environment Zone verification were completed in October 2006 and verified by the COE January 26, 2007 (Regulatory Branch 200600942). Approximately 2.5 acres of waters of the United States including wetlands (0.51 acre of WOUS and 1.99 acres of wetland) were present in the entire middle Rosewood Creek survey area (from SR 431 to SR 28).

To meet requirements of environmental laws and U.S. Department of the Interior policies, Reclamation specifically addresses potential impact of any proposed action on unique geographic features such as wetlands or SEZs. Rosewood Creek is a TRPA recognized SEZ with perennial runoff.

Floodplain and SEZ in the Lake Tahoe Basin is highly valued habitat. SEZ floodplain functions and the potential for infiltration of storm flows need to be considered during restoration. Approximately 1,375 linear feet, 0.40 acre of SEZ is located in Implementation Area F.

### 3.2.1 Impacts

No Action Alternative: Under the No Action Alternative, continued degradation of the channel bed would expand the linear distance of incised channel, exacerbating the existing discontinuity with the floodplain. The surface water elevations within the incised channel would lower relative to the surrounding terrace, worsening soil moisture support from both overbanking and groundwater. These conditions would result in lower soil moisture for adjacent riparian/SEZ vegetation community types.

Preferred Action Alternative: The Preferred Action would halt channel down cutting at and upstream of each installed grade control, minimizing the distance that existing knickpoints can migrate and reducing stress on channel banks to decrease channel widening and future bank erosion. These actions would produce a beneficial change in surface and groundwater conditions

for riparian/SEZ soil moisture conditions compared to the No Action Alternative. Additionally, to the degree possible without adverse affects on flood hazards, some areas of the channel bed may be raised, and this would produce a net benefit compared to existing conditions and the No Action Alternative.

### 3.2.2 Proposed Mitigation

During construction temporary BMPs would be installed and maintained to protect the water quality of Rosewood Creek and Lake Tahoe. In addition, protection measures would be installed (protective fencing) to minimize disturbance to that necessary for construction of proposed improvements. The Preferred Action Alternative Design (Appendix 2) presents the permanent BMPs that would be installed including restoration of the channel and adjacent SEZ.

## 3.3 Floodplains

The Federal Emergency Management Agency (FEMA) 100-year regulatory floodplain (Zone A) of Rosewood Creek is contained within the channel from SR 431 to SR 28 (FEMA Flood Insurance Rate Map panel, Appendix 3), including the Project Site. There are larger Zone X areas (defined as locations of 500-year flood or areas of 100-year flood with average depths of less than 1 foot) that run along the channel alignment between Northwood Boulevard and SR 28 in the middle reach.

Only extremely rare, large flows can overtop the banks of the incised sections of the middle reach of Rosewood Creek. The channel is currently disconnected from its alluvial flat, and the historic floodplain has been abandoned and transformed into a terrace. Channel incision involves the lowering of a streambed by erosion, and can result from various single or combined natural and unnatural processes. Therefore, many of the positive benefits of floodplain connectivity have been lost in Implementation Area F, such as flood conveyance, sediment and nutrient storage and recycling, and soil moisture adequate to support riparian habitat. The inability of the creek to overtop its banks and spread water on its floodplain contributes to further channel deepening and widening, since all of the erosive energy of large flow events is confined in the channel and directed on the bed and banks rather than being distributed over the floodplain.

A HEC-RAS model was created to model the channel hydraulic conditions under existing and with proposed installation of the grade control features at the Project Site. The modeling reach begins at the outlet of the private driveway culvert west of the intersection of Driver Way and Village Blvd. and extends upstream for approximately 1,100 feet of channel to the culvert inlet at the SE corner of College Drive and McDonald Drive.

A total of 16 cross-sections were included in the model. Roughness assumptions in the model accounted for the high roughness of the steep, boulder bed channel with large accumulations of wood and dense riparian vegetation. Modeled streamflows are based on the recurrence interval estimates presented by Mainstream<sup>12</sup>. The highest estimate of 98 cubic feet per second (cfs) was used for the 100-year recurrence interval peak flow to analyze the potential worst case flooding conditions.

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<sup>12</sup> Mainstream Restoration, Inc. 2005

Under the existing channel conditions, streamflows as large as the 100-yr flood estimate of 98 cfs are contained in the channel throughout the site, except for a small area at the downstream end where the culvert restricts flow and causes the 100-yr flow to overbank for about 200 feet upstream.

### 3.3.1 Impacts

No Action Alternative: Under the No Action Alternative the regulatory floodplain would not be modified. The 100-year flow would continue to be fully contained within the incised channel throughout most of Implementation Area F. The floodwater elevations could decrease within the reach as streambed degradation and channel widening occur in the future. The enlarged channel capacity would also continue to contain smaller flows and limit the ecological and physical benefits of over-banking to the floodplain.

Preferred Action Alternative: The Preferred Action would prevent the continued increase of channel capacity due to erosion, and would include measures to raise the streambed and water surface elevation in the incised channel. The grade control structures and upstream bed material placement represent an opportunity to improve connections between the channel and its floodplain while not increasing flood hazards.

Hydraulic modeling (using HEC-RAS) simulated the proposed grade control structures. To check for possible worst-case flood changes, a crest elevation approximately 18 inches above the existing average streambed elevation was assumed. Under this “worst-case” assumption, the 100-yr flow (98 cfs) would overbank. The “worst-case” increase would range from 1.9 feet at the most upstream weir to 0.85 feet at the most downstream weir. The width of the 98 cfs inundation area would not increase substantially at some of the weirs, but could increase from about 10 to 12 feet wide to about 25 to 35 feet wide. However, it would still remain within the existing SEZ boundary. No existing or proposed structures or infrastructure would be adversely affected by the changes in inundation under the worst case flooding impact.

### 3.3.2 Proposed Mitigation

The final design shall use updated hydraulic modeling from the summer 2007 field topographic survey of bed and bank elevations to refine the proposed grade control structure elevations in a manner that limits 100-year flow water surface increases to one foot or less and maximum floodplain area to the SEZ width.

## 3.4 Water Resources and Quality

Water resources in the Implementation Area F are limited to a single perennial drainage, Rosewood Creek, which conveys flow to Lake Tahoe as a tributary to Third Creek.

An estimate of the sediment load historically generated by channel erosion within the Project Site is 388 cubic yards<sup>13</sup>. The trend within this reach is for continued incision and eventual channel widening that would increase rates and loads generated. The proportion of fine particle size that affect lake clarity (less than 20 microns) from bulk bank sediment samples throughout the middle reach ranges from 0.4% to 8.9% (nine samples by Mainstream 2005) and from 9.7% to 25.9% (12 samples by Wood Rodgers 2006). Samples within the project reach had

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<sup>13</sup> Mainstream Restoration, Inc., 2005.

approximately 10.0% fines (Wood Rodgers 2006). Changes in fine sediment loads between the No Action and Preferred Action Alternatives would be assumed proportional to the total sediment load changes, described below.

### 3.4.1 Impacts

No Action Alternative: Under the No Action Alternative, no short-term changes in water quality would occur, but the long-term adverse impacts of substantial amounts of sediment emanating from the Project Site making its way to Lake Tahoe would continue. The approximate volume of sediment likely to be generated within the Project Site under the No Action Alternative is 2,805 cubic yards<sup>14</sup>.

Preferred Action Alternative: The Preferred Action could cause temporary adverse water quality changes during construction, and until revegetation is fully established. The Preferred Action would result in long-term beneficial changes through a decrease in channel bed and bank erosion within the Project Site, contributing to improved water quality in the downstream reaches of Rosewood Creek and Lake Tahoe. Using a method similar to the 2005 calculations by Mainstream an estimate of the approximate volume of sediment likely to be generated within the project site under the Preferred Action Alternative is 1,221 cubic yards.

### 3.4.2 Proposed Mitigation

During construction temporary BMPs would be installed and maintained to protect the water quality of Rosewood Creek and Lake Tahoe. The Preferred Action Alternative Design (Appendix 2) presents the permanent BMPs that would be installed. Because the long-term water quality impact of the project would be beneficial compared to the No-Action Alternative, no additional mitigation is recommended.

## 3.5 Biological Resources - Vegetation

Throughout the middle reach study area, dominant over-story riparian vegetation is mountain alder (*Alnus tenuifolia*), Scouler's willow (*Salix scouleriana*) and Pacific willow (*S. lucida ssp. lasiandra*). Overstory health, canopy cover, and age class are variable, with an overall lack of riparian vegetation recruitment, senescence (aging of vegetation stands), and conifer encroachment. In general, mountain alder and willow species greater than 20 feet from the top of bank in incised reaches tend towards senescence, while well-established older trees' root systems on the bank proper are healthy because they are able to follow a lowered water table, a condition that often occurs with incision. A shrub layer is typically discontinuous along the stream bank, except for discrete occurrences of red osier dogwood (*Cornus sericea*), Wood's rose (*Rosa woodsii*) and Lemmon's willow (*S. lemmonii*). The herbaceous understory varies from a dense cover of mesic graminoids like small-fruit bulrush (*Scirpus microcarpus*), bigleaf sedge (*Carex amplifolia*), common horsetail (*Equisetum arvense*), and dry graminoids like blue wildrye (*Elymus glaucus*) to that composed of forbs including western brackenfern (*Pteridium aquilinum*), stinging nettle (*Urtica dioica*), Anderson's thistle (*Cirsium andersonii*), and catchweed bedstraw (*Galium aparine*)<sup>15</sup>.

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<sup>14</sup> Mainstream Restoration, Inc., 2005.

<sup>15</sup> Mainstream Restoration, Inc., November 2005.

Within the Implementation Area F, a total of thirty-two (32) special-status plant species were identified by the USFWS as potentially occurring within the Project Site. However, none of these thirty-two plant species occur within the Project Site due to the lack of species-specific habitat requirements.

The TRPA identified four (4) Species of Special Interest with potential for occurring within the Project Site. The USFS has twenty-four (24) Sensitive Species, and eight (8) species of interest identified with potential for occurring within Implementation Area F. This, of the total number of species considered by USFWS, TRPA and USFS (68), fifty-eight (58) species are not expected to occur in Implementation Area F due to range, elevation, and habitat range limitations. Ten (10) species have potential to occur within Implementation Area F based on potential for habitat to be supported.

Section 7(a)(2) of the Endangered Species Act (the Act) requires federal agencies to consult with the USFWS to ensure that actions they fund, authorize, permit, or otherwise carry out would not jeopardize the continued existence of an listed species or adversely modify designed critical habitats.

A species list was requested from the USFWS Reno, Nevada office for the Project Site<sup>16</sup>. In a letter dated September 21, 2006 (File No. 1-5-06-SP-296), the USFWS determined that no federally threatened or endangered plant species are known to occur within the Project Site. An additional follow-up database check was conducted with the USFWS Sacramento National Forest Species List web page<sup>17</sup>. The web list also listed no federally protected species.

The Tahoe Regional Planning Compact (“Compact”, P.L.96-551, 94 stat. 3233, 1980) finds that, “There is a public interest in protecting, preserving and enhancing environmental and ecological values for the residents of the region and for visitors to the region.” In order to protect the natural environment, the TRPA has established environmental threshold carrying capacities pertaining to conservation of vegetation, uncommon plant communities, and sensitive plant species.

USFS sensitive species are those plants identified by the Regional Forester for which population viability is a concern. Concern is warranted by a downward trend in population numbers, density, or habitat conditions, which would reduce a species’ existing distribution (Forest Service Manual or FSM 2670.5). Sensitive species are managed so that USFS actions ensure that these species do not become threatened or endangered (FSM 2670.22).

Information on listed threatened, endangered, and candidate species, USFWS Sensitive Species and TRPA Species of Special Interest with the potential to occur within the Project Site was obtained from the TRPA, the Nevada Natural Heritage Program (NNHP), the USFS, and the USFWS. Consultation with these agencies and review of published biological studies and maps resulted in a list of plant species that warrant consideration (Appendix 4).

Awareness of potential habitat for special status, threatened and endangered species in and around the Project Site is needed to assure preservation of resources necessary for their

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<sup>16</sup> Wood Rodgers, Inc. Sept. 7, 2006

<sup>17</sup> US Fish and Wildlife Service Sacramento Fish and Wildlife Office, July 5, 2007

protection. Implementation Area F does not support any threatened, endangered, or sensitive vegetation species<sup>18</sup>.

There is no known occurrence of noxious weeds present in the Project Site; however, tall whitetop is known to be present just downstream of the Project Site to the west of the intersection of Village Blvd. and Driver Way.

### 3.5.1 Impacts

No Action Alternative: Under the No Action Alternative, the riparian/SEZ community would continue to degrade as a response to the channel instability and continued erosion and poor surface and groundwater trends. Implementation Area F would likely continue to lack any threatened, endangered, or sensitive vegetation species. The vegetation structural diversity and health would most likely continue to degrade enhancing the potential for the known occurrence of tall whitetop currently occurring in the watershed to invade the site.

Preferred Action Alternative: Channel restoration construction activities would cause temporary impacts to existing vegetation, but all trees greater than six-inch diameter would be avoided entirely for temporary and permanent proposed improvement footprint areas. Implementation Area F would likely continue to lack any threatened, endangered, or sensitive vegetation species. The vegetation community would likely remain largely the same, but some improvements in structural diversity and would most likely occur. Direct changes to the stream bank vegetation through revegetation and stabilization activities would provide an opportunity for desirable species selected to hold soils to become established. Revegetation of areas disturbed by construction activities would enhance species structural diversity as well as being adapted to both wet and dry conditions enhancing ability to provide long-term to soil cover and protection.

Vegetation management recommendations to be provided to the private landowner as well as the project sponsor would provide guidance for maintaining vegetation health to deter future noxious weed infestation as well as defensible space for fire protection.

### 3.5.2 Proposed Mitigation

The 50% Design Plans include a revegetation plan that would address all areas disturbed by construction activities (sheet R-1, Appendix 2). In addition, the revegetation plan includes measures to enhance existing native plant communities as well as provide for bank stabilization.

## 3.6 Biological Resources - Wildlife

Wildlife habitat occurring within the Project Site includes forested and water based communities (riparian/wetland). The Tahoe Basin is home to many common species of fauna that are present commensally with humans. Most species are associated with montane forests, but would also tolerate forests fragmented by urbanization. The Tahoe Basin supports a wide range of wildlife species that vary at different times of the year. The native wildlife community is a natural and integral component of the Lake Tahoe ecosystem. It has been documented that 289 terrestrial (and semi-terrestrial) vertebrates occur as residents or regular visitors. This total represents 217 bird, 59 mammal, 8 reptile, and 5 amphibian species (TRPA 2002<sup>19</sup>). An additional 57 terrestrial

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<sup>18</sup> Wood Rodgers, 2007

<sup>19</sup> Tahoe Regional Planning Agency. 2002.



species have been recorded in the basin as accidental visitors or as species facing extinction from the basin. Consequently, the Tahoe Basin provides environmental conditions and habitats conducive for a somewhat diverse list of species, with opportunities to fulfill their respective life history requirements.

Within the Project Site, a total of twenty-eight (28) special-status wildlife species were initially identified as potentially occurring. Of these, four (4) wildlife species are given special protective status and are managed under the jurisdiction of the USFWS. Additionally, the TRPA has nine (9) species; the USFS-LTBMU has twelve (12) sensitive species listed, and the State of Nevada (State) has three (3) species.

Of the total number of species occurring on the various agency lists, and listed as protected by the USFWS, fifteen of the potential twenty-eight species are not expected to occur in the Project Site due to range, elevation, and habitat range limitations and ten species have potential to occur within the Project Site.

Section 7(a)(2) of the Endangered Species Act (the Act) requires federal agencies to consult with the USFWS to ensure that actions they fund, authorize, permit, or otherwise carry out would not jeopardize the continued existence of an listed species or adversely modify designed critical habitats.

A species list was requested from the USFWS Reno, Nevada office for the Project Site<sup>20</sup>. In a letter dated September 21, 2006 (File No. 1-5-06-SP-296), the USFWS determined that 1 (one) federally threatened and no endangered wildlife species have known ranges within the Project Site. This list included the bald eagle (*Haliaeetus leucocephalus*). An additional follow-up database check was conducted with the USFWS Sacramento National Forest Species List web page on July 5, 2007. The web list listed a total of 4 federally protected species including the Bald eagle, Delta smelt (*Hypomesus transpacificus*), Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*), and Central Valley steelhead (*Oncorhynchus mykiss*) as having potential of occurring within Implementation Area F; however, the list only identifies species that may occur within the Tahoe Basin, rather than being specific to the Project Site. Descriptions of the habitat and status of the federally protected species can be found in the project Biological Assessment/Biological Evaluation<sup>21</sup> (Available at the NTCD/LTBMU offices). Thus, based on species specific habitat requirements, only the bald eagle has potential to occur within Implementation Area F.

In addition to the species listed under the Endangered Species Act, several additional wildlife species are given special status within the Tahoe Basin and National Forest.

The Tahoe Regional Planning Compact (“Compact”, P.L. 96-551, 94 stat. 3233, 1980) finds that, “There is a public interest in protecting, preserving and enhancing environmental and ecological values for the residents of the region and for visitors to the region”. In order to protect the natural environment, the TRPA has established environmental threshold carrying capacities pertaining to conservation of vegetation, uncommon plant communities, and sensitive wildlife species.

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<sup>20</sup> Wood Rodgers, Inc. Sept. 7, 2006

<sup>21</sup> Wood Rodgers, Inc. 2007

USFS sensitive species are those wildlife species identified by the Regional Forester for which population viability is a concern. Concern is warranted by a downward trend in population numbers, density, or habitat conditions, which would reduce a species' existing distribution (FSM 2670.5). Sensitive species are managed so that USFS actions ensure that these species do not become threatened or endangered (FSM 2670.22).

Information on listed threatened, endangered, and candidate species, USFWS Sensitive Species and TRPA Species of Special Interest with the potential to occur within the Project Site was obtained from the TRPA, the NNHP, the USFS, and the USFWS. Consultation with these agencies and review of published biological studies and maps resulted in a list of wildlife species that warrant consideration (Appendix 4).

Awareness of potential habitat for special status, threatened and endangered species in and around the Project Site is needed to assure preservation of resources necessary for their protection. Under existing conditions, and most likely in the future, Implementation Area F would not support suitable habitat for any of the sensitive wildlife species that may have potential to occur, due to current level of urbanization and habitat fragmentation.

### 3.6.1 Impacts

No Action Alternative: Under the No Action Alternative, minor changes to the upland habitat and continued degradation of the riparian and aquatic habitat would be expected, but not to a degree that would substantially alter existing habitat characteristics or quality. As such, current occurrence of common wildlife species is expected to continue. As well, lack of habitat suitability, urbanization, and fragmentation would continue to deter occurrence of sensitive species.

Preferred Action Alternative: Construction activities associated with the Preferred Action would temporarily affect foraging habits of all wildlife species. However given the fact that no critical habitat is present for sensitive species, and the temporary vegetation disturbance would be restored, impacts to wildlife species and their habitat are not likely to be adverse.

## 3.7 Archaeological Resources

A Class III cultural resources inventory of the Rosewood Creek study area was conducted in September 2006<sup>22</sup>. The inventory included a file search at the Nevada State Museum, an archival review of the USFS files, review of previous studies near the Project Site, and review of site description information for the presence of prehistoric or historic period cultural resources and an intensive site visit.

Three isolated features were noted within the study corridor as part of the present study. Feature RC-1 consists of a blaze located on the north-facing surface of a large pine (see photo to the right). The 20-inch (diameter at breast height or dbh) tree is located near the intersection of Village Boulevard and Harold Drive, adjacent to a modern stormwater detention basin. The tree with the blaze appears to be near or at Section 12, a cross section of the stream channel marked and recorded by Wood Rodgers, the topographic surveyor. The blaze is located about four feet from ground level and is about six by eight inches in size. No marking or writing was evident in the blazed area.

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<sup>22</sup> Zeier and Associates, 2006

Feature RC-2 is a segment of ½ inch diameter woven wire rope that has been tied around a 24-inch (dbh) diameter tree. The wire is located about 2.5 feet from ground level and has, in some areas, been overgrown by the bark of the tree. This feature is also located near the intersection of Village Boulevard and Harold Drive, adjacent to the modern stormwater detention basin.

Feature RC-3 seems to be remains of a wooden bridge that have been buried by alluvial fill material. Remnants of the bridge were noted in the Rosewood Creek stream and in the stream bank<sup>23</sup>. Temporal indicators were not noted, but it is likely that the bridge dates to the Comstock logging era, or approximately between 1878 and 1896. During this period, Rosewood Creek and the surrounding watershed were logged and trees of any size were removed for reduction into saw logs or as cordwood. This is the only land use known for the area that might have prompted construction of a bridge.

Areas to the east and west of the bridge were examined to determine if remnants of a road were present. No evidence of a road was noted. This is likely due to the amount of alluvial deposition that has occurred in the floodplain since abandonment of the bridge, and the amount of residential development that has occurred over the last forty years.

Examination of large granite boulders in the study area failed to identify any bedrock mortars or grinding surfaces. Some recent debris was present within the study area, especially in areas along roadways and along walkways. This “toss zone” included aluminum cans, bottles and bottle glass, Styrofoam containers, and paper. All such items are “recent” (less than 50 years in age) and none were recorded.

It is noted that residential buildings are present in the vicinity of the study area. An architectural inventory needs assessment was not prepared as a part of this study (the present report only deals with archaeological resources). Incline Village is a relatively new community. While residential construction began in the early 1960s, most occurred during the 1970s and 1980s. While it is considered unlikely, it is acknowledged that buildings greater than 50 years in age might be present within the proposed project’s viewshed.

With respect to National Register Considerations, three isolated features were identified as part of the present study. They include a tree blaze (RC-1), a length of wire rope wrapped around a tree (RC-2), and remains of what appears to be a crib-style bridge (RC-3). The wire rope and bridge most likely date to the Comstock era of logging in the area (1870s through 1896). While they were part of an activity significant at the local and regional basis (Comstock era lumbering), neither feature exhibits a strong relationship with other features or feature systems representative of that industry (Criterion A). An association cannot be drawn between either feature or an individual significant within the context of local or regional history (Criterion B). While representative of specific site types, the recorded features do not exhibit characteristics or construction methods that are of particular interest (Criterion C). Finally, the two features offer only limited potential to yield information regarding a significant aspect of local or regional history (Criterion D). Based on these considerations, it is recommended that RC-2 and RC 3 are not eligible for listing on the National Register of Historic Places based on any of the four significance criteria.

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<sup>23</sup> Mainstream Restoration, Inc., 2005.

Roadside debris that is less than 50 years in age was noted at various locations throughout the study area. None of those items are of an exceptional nature and, therefore, a consideration of their National Register eligibility is not required at this time.

Some architectural resources located adjacent to the study area might be more than 50 years in age. Even if present, it is unlikely that the nature or scope of the proposed project would have an impact on the integrity of setting associated with architectural resources eligible for listing on the National Register of Historic Places.

Three historic period isolated features were recorded within the preliminary area of potential effect as a result of the present study. The newly identified resources were documented and evaluated regarding their potential National Register eligibility.

After due consideration, it was recommended that none of the isolated features are eligible for listing on the National Register of Historic Places under any of the four significance criteria. As a result, no historic properties (National Register eligible resources) would be affected due to implementation of the stream restoration project. In the absence of an effect upon National Register eligible historic properties, additional management recommendations regarding possible treatment options are not necessary.

On August 24, 2007 Reclamation concurred with these findings in their letter to the Nevada State Historic Preservation Office<sup>24</sup>. On September 18, 2007 the State of Nevada Department of Cultural Affairs State Historic Preservation Office (SHPO) concurred with Reclamation's determination that no historic properties were found within the area of potential effects for the subject undertaking. In addition, the SHPO concurred with Reclamation's determination that the proposed undertaking will not pose an effect to any historic properties<sup>25</sup>.

### 3.7.1 Impacts

No Action Alternative: Under the No Action Alternative, the isolated feature within the Project Site (RC-3), which is not recommended as eligible for listing on the National Register of Historic Places, would continue to be subject to channel degradation that is exposing and leading to deterioration. Feature RC-3 would be subject to continued exposure by bed degradation and bank erosion, but could eventually experience some burial by further channel adjustments.

Preferred Action Alternative: Under the Preferred Action, channel restoration construction activities may cause temporary impacts to the channel area near feature RC-3, which is just upstream of a proposed temporary bypass flow berm and at least 20 feet upstream of a proposed grade control structure. The long-term changes to the channel bed and banks, and the reduced flow velocities within the incised channel in the vicinity of Feature RC-3 should be beneficial in reducing the rate of exposure and decay of this resource.

### 3.7.2 Proposed Mitigation

Given the unique nature of Feature RC-3, the project sponsor with the assistance of the Cultural Resources Specialist has established a buffer zone of ten (10) feet on all sides of the feature to

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<sup>24</sup> US Bureau of Reclamation, 2007

<sup>25</sup> Nevada State Historic Preservation Office, 2007

protect its remaining integrity. This buffer would be noted on all plans and in the specifications and flagged in the field prior to construction.

### **3.8 Indian Trust Assets**

Indian Trust Assets (ITA) are defined as legal interests in property held in trust by the United States for Indian Tribes or individuals, or property that the United States is otherwise charged by law to protect. On August 21, 2007, Reclamation ITA point of contact determined the proposed action would not affect Indian Trust Assets. The nearest ITA to the proposed Project Site is approximately 12 miles southeast of the proposed project and is the property of the Washoe Tribe of Nevada and California.

#### **3.8.1 Impacts**

No Indian Trust Assets are known to occur in the Project Site.<sup>26</sup> Thus, no impacts are projected under either of the alternatives.

### **3.9 Land Use and Facility Resources**

Present land use in the Project Site is residential. Washoe County maintained stormwater conveyance structures (culverts) are located at the most upstream and most downstream extent of the Project Site.

During construction, an increase in noise and changes in traffic movement would occur. All construction activities would be required to comply with TRPA noise and work hour constraints. NTCD and its contractors would work with adjoining landowners to address concerns regarding disturbances during construction of the restoration improvements. Any complaints would be resolved on a case-by-case basis.

Activities associated with restoration of the stream channel of Rosewood Creek would affect existing stormwater conveyance facilities (drop inlets/culverts), and possibly affect underground utilities. Access to the channel for construction purposes would require access on public and private lands.

#### **3.9.1 Impacts**

No Action Alternative: Under the No Action Alternative, no changes to existing infrastructure, access, or encroachment on public or private lands would result.

Preferred Action Alternative: The Preferred Action would implement improvements to the stormwater conveyance facilities at the intersection of McDonald Drive and College Avenue including the addition of a relocated, flared end section and rock riprap dissipater, and sediment can with flared end section and rock riprap dissipater designed to remove sediment from urban stormwater, stabilize the outlet to Rosewood Creek, increase surface water flow and infiltration in the riparian/SEZ plant community.

Staging, storage and access to Implementation Area F would require the use of private lands and USFS administered lands, but would be sited to minimize impacts to the existing terrace, riparian and upland vegetation. The NTCD or the project construction sponsor would obtain a Special Use Permit from the USFS and an access agreement with the private landowner.

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<sup>26</sup> Reclamation, August 21, 2007

### 3.9.2 Proposed Mitigation

Proposed mitigation includes limiting construction to one location at a time to minimize construction nuisance. In addition, all disturbance areas will be re-vegetated to restore and most likely enhance the existing plant communities. Disturbed riparian plant communities would be restored with the focus being plant community enhancement to the extent possible.

To the extent possible, without causing additional undue disturbances, existing deadfall would be removed to minimize fuel hazard.

### 3.10 Recreation Resources

Lake Tahoe recreation is dependent upon the alpine setting and extraordinary water quality. Urbanization has caused a reduction in the overall quality of water reaching the Lake. Improving stormwater runoff treatment and restoration/enhancement of drainages and SEZs serves to protect Lake Tahoe's attractiveness as a recreational area.

Drainages and SEZs may at times be impacted by uncontrolled pedestrian access. Footpaths created by pedestrians crossing channels results in increased erosion through destabilization of channel banks and destruction of vegetation.

Proposed improvements to Implementation Area F are occurring on private lands where access is currently limited to "by permission only." Public access is afforded on the USFS parcel, however due to its isolated location and the dense overgrowth, access is infrequent.

#### 3.10.1 Impacts

No Action Alternative: Under the No Action Alternative, the current trend of channel down cutting and destabilized banks would continue. This would result in increased nutrient and sediment load to downstream reaches and Lake Tahoe, incrementally contributing to degraded recreation resources. In addition, the existing vegetation communities would most likely continue to contribute to deadfall thereby increasing fuel hazards.

Preferred Action Alternative: Under the Preferred Alternative it is not anticipated that the level of access would increase for recreational purposes. The private parcel would remain access "by permission only", and the density of riparian vegetation on the USFS parcel would continue to deter recreational use. An incremental contribution to water quality improvement/protection would be made that would be beneficial to regional recreation resources. Implementation of vegetation management recommendations by private landowners would affect a positive trend in plant community health and fuel reduction.

#### 3.10.2 Proposed Mitigation

Signage would be placed at the Project Site to inform the public of the restoration efforts, purpose, and benefits.

### 3.11 Social and Economic Factors

Restoration of Middle Rosewood Creek would provide a minor amount of local employment for a few months during the construction period. This would introduce a small amount of money into the local economy, but is not expected to place a strain on public services such as school, public services, or transportation.

The NTCD has committed to completing the proposed restoration design as well as implementation of permanent BMPs for stormwater conveyance and pre-treatment as required under TRPA Code.

### **3.12 Environmental Justice**

Executive Order 12898 established environmental justice as a federal agency priority to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations of the United States and its territories and possessions, and the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of Mariana Islands.

Since the proposed project would result in no change in existing or similar land uses, there would be no adverse human or environmental effects to minority or low-income populations.

### **3.13 Summary of Mitigation Measures**

The proposed project, by design and regulation is an Environmental Improvement Project, thus, it is proposed that the restoration of the middle reach of Rosewood Creek would create long-term environmental benefits in addition to proposed mitigation measures (below):

- a. Alleviate long-term adverse water quality impacts resulting from unstable and eroding stream channels within Area F of Rosewood Creek. The project provides vertical grade stabilization in a historically disturbed and degrading stream. The project will prevent continued streambed and stream bank erosion that generates sediment transported to lower Rosewood Creek and Lake Tahoe, and,
- b. Provide permanent BMPs to pre-treat urban runoff prior to discharge to the creek from McDonald Drive and College Avenue. The proposed project incorporates elements within the roadside Right-of-Way that upgrade or constructs new stormwater BMPs of appropriate size, type, and location to reduce urban pollutants in flows discharged to the creek, and to direct the stormwater to locations along the riparian community that will benefit hydrologically.

The implementation of the Preferred Alternative would include mitigation measures to:

1. Provide appropriate measures to protect water quality including temporary BMPs during construction. The project design includes standard BMPs (Sheet S-1, Appendix 2).
2. The final design would use updated hydraulic modeling from the summer 2007 field topographic survey of bed and bank elevations to refine the proposed grade control structure elevations in a manner that limits water surface increases to one foot or less and restricts the maximum 100-year floodplain area to the SEZ width.
3. Protect and enhance the riparian plant community. The proposed project includes design elements to limit disturbance to only that necessary to conduct the construction activities offering the maximum protection to existing vegetation and all trees over six-inch in diameter. In addition, restoration revegetation design would focus on using native species that are adapted to wetting and drying conditions of this SEZ and that enhance the plant community structural and species diversity but yet still mimics the existing communities.

4. Reduce existing down and dead fuels within the areas of project disturbance. To the extent possible, construction activities will remove down and dead fuels during access to work areas. In addition, private landowners will be provided with guidance for management to enable them to maintain healthy plant communities and reduce fuel hazards.
5. Given the unique nature of Feature RC-3, the project sponsor, with the assistance of the Cultural Resources Specialist has established a buffer zone of ten (10) feet on all sides of the feature to protect its remaining integrity. This buffer would be noted on all plans and in the specifications and flagged in the field prior to construction.



## 4.0 CONSULTATION AND COORDINATION

Please refer to Appendix 1 for a full listing of all consultation and coordination efforts to date with the Technical Advisory Group and the Public.

Agency Consultations other than those included in the TAG included the following:

### 4.1 Endangered Species Act

The Proposed Action would have no effect on listed species and further consultation with the USFWS is not required.

### 4.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) provides the basic authority for USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. The FWCA does not apply to this project because the proposed project does not entail the development of water resources.

### 4.3 National Historic Preservation Act of 1966, as amended (16 U.S.C 470 et seq.), Historic and Archaeological Resources Protection Act (16 U.S.C 470AA et seq.), Protection of Historic Properties (36 CFR 800).

Reclamation initiated consultation with the Nevada State Historic Preservation Office on August 24, 2007 seeking concurrence with their finding of no historic properties affected for the proposed stabilization of the Rosewood Creek channel<sup>27</sup>. On September 18, 2007 the State of Nevada Department of Cultural Affairs State Historic Preservation Office (SHPO) concurred with Reclamation's determination that no historic properties were found within the area of potential effects for the subject undertaking. In addition, the SHPO concurred with Reclamation's determination that the proposed undertaking will not pose an effect to any historic properties<sup>28</sup>.

### 4.4 Clean Water Act (33 U.S.C. 1251 et seq.)

The proposed project would be conducted under General Permit 16 MINIMAL IMPACT ACTIVITIES THE LAKE TAHOE BASIN (GP16) issued on October 1, 2005 with an Expiration Date of September 30, 2010. This general permit is issued under the authority of Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344) in accordance with provisions of "Regulatory Programs of the Corps of Engineers" (33 CFR 320-331).

The 50% Design Plans were developed to avoid and minimize adverse effects to aquatic resources as well as a revegetation plan to stabilize disturbed areas, and enhance existing riparian/SEZ areas.

The project would also require a National Pollution Discharge Elimination System (NPDES) permit since it would disturb one or more acres of land and involve stormwater discharges to surface water. Prior to construction, the Contractor would be required to prepare a Storm Water Pollution Prevention Plan (SWPPP), and submit a Notice of Intent to the Nevada Division of

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<sup>27</sup> US Bureau of Reclamation, 2007

<sup>28</sup> Nevada State Historic Preservation Office, 2007

Environmental Protection Bureau of Water Pollution Control requesting approval of the proposed work. The SWPPP would identify best management practices to be used to avoid and minimize any adverse effects of construction activities on surface waters. Once the work is completed, the Contractor would submit a notice of Termination in order to terminate coverage by the NPDES permit.

#### **4.5 Executive Order 11988 – Floodplain Management**

The order generally directs Federal agencies to avoid adverse impacts associated with occupancy or modification of floodplains, and direct or indirect support of floodplain development. The proposed project would not increase, occupancy, modify or create development in floodplains.

#### **4.6 Executive Order 11990 – Protection of Wetlands**

The order directs Federal agencies to avoid adverse impacts associated with the destruction or modification of wetlands, and to avoid support of new construction in wetlands. The proposed project does not propose new construction in wetlands or destruction of wetlands.

#### **4.7 Executive Order 13112 – Invasive Species**

The order directs Federal agencies to prevent the introduction of invasive species and control, monitor, and provide restoration to native environment that have been invaded by invasive species.

No invasive species have been documented within Implementation Area F. In order to prevent the spread of invasive species, the proposed project requires that all construction equipment be steam cleaned prior to mobilization at the Project Site.

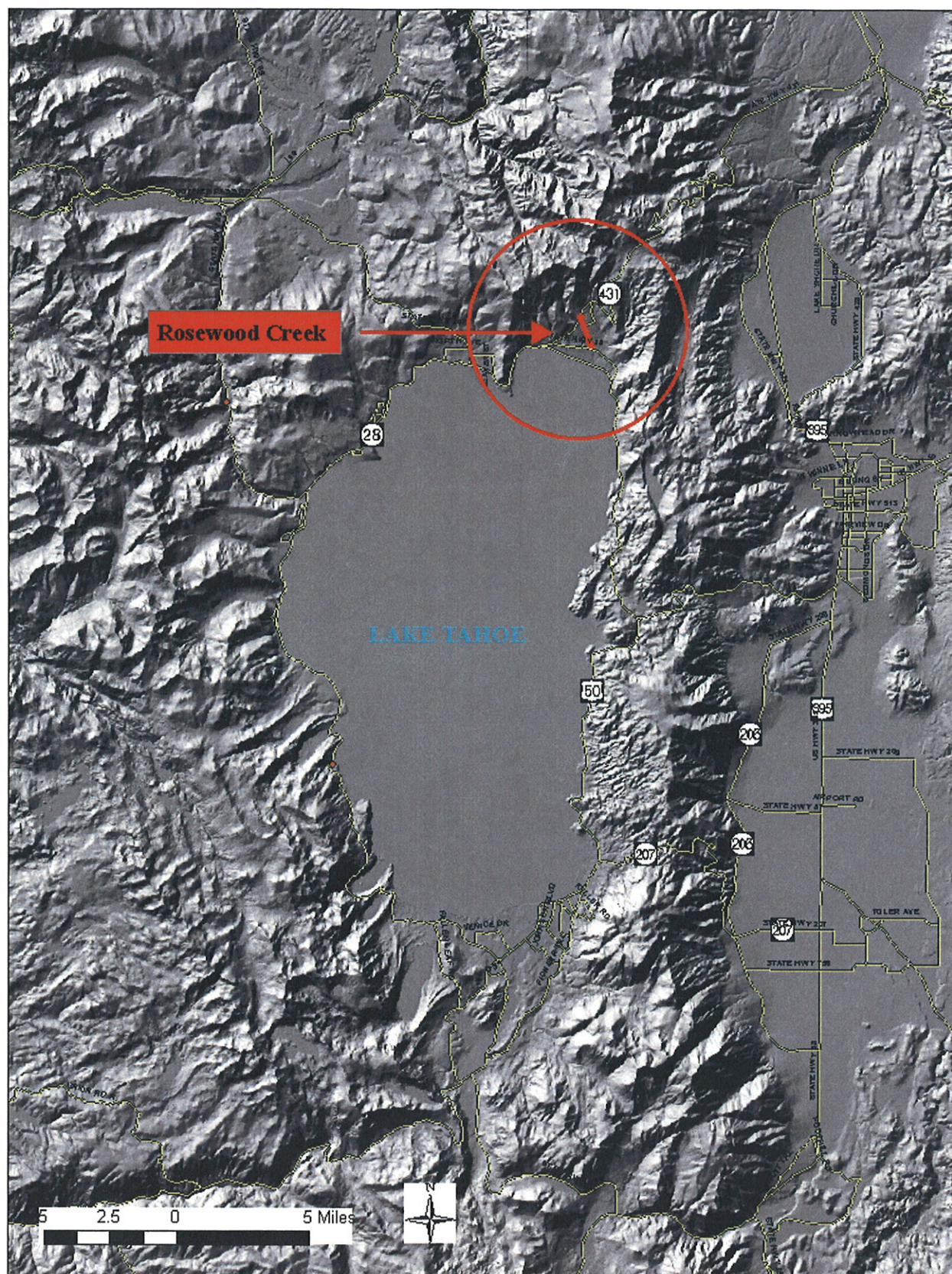
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## **FIGURES**



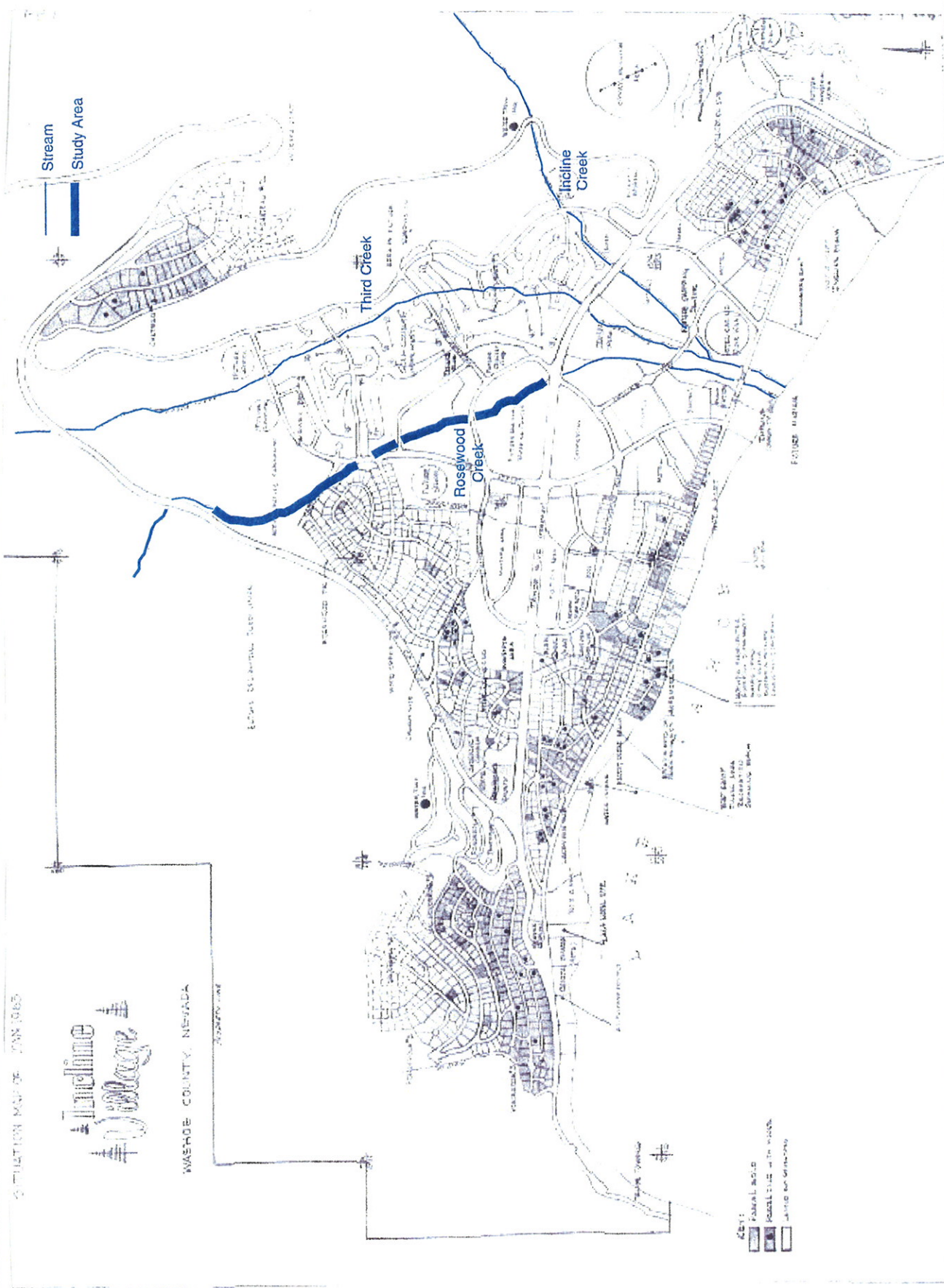


**FIGURE 1**  
**MIDDLE ROSEWOOD CREEK**  
**VICINITY MAP**









**FIGURE 3.**  
**DEVELOPMENT MAP OF INCLINE VILLAGE, DATED JANUARY 1963**